STATE OF MISSOURI
DEPARTMENT OF NATURAL RESOURCES
AIR POLLUTION CONTROL PROGRAM
205 JEFFERSON STREET, P.O. BOX 176
JEFFERSON CITY, MISSOURI 65102

EMISSIONS INVENTORY QUESTIONNAIRE (EIQ)

FORM 2.3 VOC PROCESS MASS-BALANCE WORKSHEET

SHADED AREAS FOR OFFICE USE ONLY

FACILITY NAME	FIPS COUNTY NO.	PLANT NO.	YEAR OF DATA

POINT NO.	AIRS ID-PT	SOURCE CLASSIFICATION CODE (SCC)	SEG. NO

[1] TOTAL ANNUAL THROUGHPUT AND TOTAL POUNDS OF VOC

APPLICATION METHOD	MATERIAL TYPE	A ANNUAL THROUGHPUT (SCC UNITS/YR)	B % BY WT OF VOC IN MATERIAL	C DENSITY (LBS/GAL)	D LBS OF VOC PER UNIT	E VOC (LBS/YR)
ENTER THE **TOTAL ANNUAL THROUGHPUT** AMOUNT CALCULATED TO THE RIGHT, IN BLOCK 4 ANNUAL THROUGHPUT ON FORM 2.0.		TOTAL ANNUAL THROUGHPUT (SCC UNITS)	IF A IS IN GALLONS, THEN B X C = D IF A IS IN TONS, THEN B X 2000 = D **A X D = E**		**TOTAL VOC (LBS/YR)**	

[2] CALCULATION OF VOC RECOVERED

LBS OF VOC RECOVERED =
{MATERIAL SHIPPED AS HAZARDOUS WASTE} X {% OF VOC CONTENT OF WASTE}

MATERIAL SHIPPED AS HAZARDOUS WASTE	% OF VOC CONTENT OF WASTE	LBS OF VOC RECOVERED

DOCUMENTATION MUST BE SUPPLIED TO SUPPORT THE AMOUNT OF MATERIAL SHIPPED AND THE % VOC CONTENT.

[3] CALCULATION OF VOC EMITTED PRIOR TO CONTROL

LBS OF VOC EMITTED PRIOR TO CONTROL EQUIPMENT

{TOTAL LBS OF VOC} - {LBS OF VOC RECOVERED}

LBS OF VOC EMITTED PRIOR TO CONTROL

[4] CALCULATION OF EMISSION FACTOR

EMISSION FACTOR

{LBS OF VOC EMITTED PRIOR TO CONTROL EQUIPMENT} / {TOTAL ANNUAL THROUGHPUT}

EMISSION FACTOR IN LBS/UNIT

ENTER THE EMISSION FACTOR IN VOC BOX OF BLOCK 7 ON FORM 2.0, EMISSION POINT INFORMATION

INSTRUCTIONS
FORM 2.3 VOC PROCESS MASS-BALANCE WORKSHEET

This is a **REQUIRED FORM** if a facility is using mass balance to calculate a volatile organic compound (VOC) emission factor. An emission factor calculated by mass balance will usually be more accurate for a specific process at your facility than using the standard U.S. Environmental Protection Agency (EPA) emission factor. You still need to associate the process with a Source Classification Code (SCC) even if you calculate your own emission factor.

A separate Form 2.0, Emission Point Information, and Form 2.3, VOC Process Mass-Balance Worksheet, should be completed for each different process that emits VOCs within your facility. Examples of VOC operations include degreasing, spray painting, adhesive application, flexographic or gravure printing, and equipment cleaning. Each VOC process will have a separate SCC and calculations need to be on separate worksheets. Additional VOC Process Mass-Balance Worksheet forms may be needed to show different VOC material types associated with the same emission point.

Please maintain a copy of the Material Safety Data Sheet (MSDS) for each of the VOC materials listed on Form 2.3.

Complete **Facility Name, FIPS County Number, Plant Number and Year of Data.**
See Form 1.0 instructions, page 1.0-1.

Point Number: This is the unique identification number for each specific VOC process. This identification must match the point number entered on Form 1.1, Process Flow Diagram, Form 1.2, Summary of Emission Points and Form 2.0, Emission Point Information.

AIRS ID-Pt and Seg No.: To be completed by the APCP.

Source Classification Code (SCC): List the code that identifies the type of process associated with this emission point.

1) TOTAL ANNUAL THROUGHPUT AND TOTAL POUNDS OF VOLATILE ORGANIC COMPOUNDS

Application Method: This application method uniquely identifies the operation or VOC process that is producing the VOC emissions for this emission point. Examples include spray, roller, dip or electrostatic.

Material Type: This box is used to uniquely identify the material being used. Examples include primers, paints, clear coats, inks, thinners and solvents. For primers, paints and inks, different colors of these materials may be grouped together into the same emission point if the percent VOC in each material is the same.

Annual Throughput (SCC Units/Yr) [A]: This figure is the total amount of a specific material type used at this emission point during the year. This figure must be expressed in the appropriate SCC units for this emission point. Material that is not used and is returned to the manufacturer as "out of specification" should not be included in this Annual Throughput figure.

Percent by Weight VOC in Material [B]: This value of the percent of VOCs in the material (by weight) should be available from the MSDS provided by the supplier for the specific material associated with this emission point. You may leave this box blank if the Pounds of VOC per Unit **[D]** has been completed for this material. If SCC unit is **tons,** then Percent by Weight of VOC would be in tons, not gallons.

Density [C]: The value for the material should be available from the MSDS provided by the supplier for the specific material associated with this emission point. If the specific gravity is given on the MSDS, multiply the specific gravity by 8.34 to obtain the density expressed in pounds of material per gallon of liquid. If the SCC unit is **tons**, then density would always be 2000 pounds.

Lbs. of VOC Per Unit [D]: The value for this material should be available from the MSDS provided by the supplier for the specific material associated with this emission point. If the Pounds of VOC per Unit figures are not known, then they can be calculated by multiplying the Percent VOC by Weight **[B]** in the material by the Density **[C]** of that material. If the SCC unit is **tons**, then Lbs. Of VOC Per Unit would be in tons, not gallons.

VOC (Pounds/Year) [E]: This figure is the total amount of VOCs released for the specific material associated with this emission point. The VOC figure can be calculated by multiplying the Annual Throughput **[A]** for each material by the Pounds of VOC per unit **[D]** for the same material.

Total Annual Throughput: This figure must be expressed in the same units as the SCC emission factor units used with the specific process for this emission point. This figure should be entered in the appropriate box in Block 4 of the Form 2.0, Emission Point Information, that is associated with this emission point.

Total VOC(Pounds/Year): This figure is the total of the VOC amounts calculated in the above boxes.

2) CALCULATION OF VOC RECOVERED

Material Shipped as Hazardous Waste: This figure is the total amount of material listed on the Hazardous Waste Manifest as having been shipped from this particular VOC process during the year. This figure should be expressed as the total pounds of waste shipped for this emission point. Waste materials that were not included in the Annual Throughput figure calculated above should not be included in the VOC calculation for this block. **Documentation must be provided for the amount of material shipped.**

Percent VOC Content of Waste: This figure is the weighted average for the VOC content of all shipments of hazardous waste shipped from this emission point. If specific test data is not available on the VOC content of the waste, an estimate for this percent VOC figure may be provided with any supporting documentation available. **Supporting documentation must be provided for the percent VOC content.**

Pounds of VOC Recovered: This figure is the amount of VOC recovered or shipped as a liquid hazardous waste from the process associated with this emission point.

3) CALCULATION OF VOC EMITTED PRIOR TO CONTROL

Calculate the **Pounds of VOC Emitted Prior to any Control** devices by taking the Total Pounds of VOC figure and subtracting the Pounds of VOC Recovered. The result of this subtraction should be the total amount of VOCs emitted from the VOC process during the year.

3) (Continued)

INTERIM POLICY AS OF FEBRUARY 11, 1999:

Emissions from inks used by Non-heatset, Offset Lithographic Printers should be adjusted by multiplying "Lbs of VOC Emitted Prior to Control" by 5%. This calculation should be noted on item [3]. The EPA method 24 may also be used to calculate a percentage in lieu of the 5% value. Calculations for determining this percentage must be submitted with the Form 2.3. Note that either the percentage calculated using EPA method 24, or the 5% value may be used, but not both.

4) BACK CALCULATION OF EMISSION FACTOR

The VOC Emission Factor should be calculated by taking the Pounds of VOCs Emitted Prior to Control Equipment and dividing by the Total Annual Throughput. (Annual Throughput must be expressed in terms of SCC units.)

Emission Factor: This figure is the value that the equation described above calculated. This Emission Factor should be entered in the VOC Emission Factor box in Block 7 on the Form 2.0, Emission Point Information, that is associated with this emission point.

Emission Factor Units: The units entered in this box should be the same as the SCC units for this emission point. Some common units for VOCs are lbs/gallon and lbs/ton.